

Sub E1  
Cont

- anti-parallel to the first direction when in a quiescent state;
- (c) forming a spacer layer between the first and second FM free layers; and
  - (d) forming first and second anti-ferromagnetic (AFM) layers on the first and second FM free layers, respectively; the first and second AFM layers each producing a bias magnetization field that respectively biases  $M_1$  and  $M_2$  in a third direction that is transverse to the first and second directions.

D1

18. (New) The method of claim 17, wherein:

- the first and second AFM layers have substantially equivalent anneal temperatures; and
- the forming step (d) includes setting the bias magnetization fields of the first and second AFM layers simultaneously by cooling the first and second AFM layers through the anneal temperatures while applying a magnetic field in the third direction.

D2